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10/032,272	12/22/2001	Haoshi Song	1391-27300	6530

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EXAMINER
WERNER, BRIAN P

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 02/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/032,272	SONG ET AL.	
	Examiner	Art Unit	
	Brian P. Werner	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Claim 26 is missing. Therefore, misnumbered claims 27-43 have been renumbered as 26-42. The examiner shall refer to the renumbered claims hereinafter.

2. The following quotations of 37 CFR § 1.75(a) and (d)(1) are the basis of objection:

> (a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

3. Claims 7 and 8 are objected to under 37 CFR § 1.75(a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery. Both claims lack an antecedent basis for "the predetermined features". Claim 6 does offer an antecedent basis for this term. Therefore, claims 7 and 8 will be assumed to depend from claim 6 for examination purposes. Formal correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 10 is rejected under 35 U.S.C. 102(e) as being anticipated by Precision Tube Technology (excerpts from the 1999 publication titled Coiled Line Pipe Solutions).

Regarding claim 10, Precision discloses a tubing (refer to the figure depicting the tubing layers) comprising:

an outer wear layer ("HDPE"); and

a contrasting layer beneath the wear layer ("Coiled Pipe");

wherein if the outer wear layer is worn away, the contrasting layer becomes visible as a contrasting feature on the tubing (the claim does not require any particular manner of "contrasting", thus any manner of "contrasting" will suffice; if the outer layer of the Precision tubing is worn away revealing the inner layer, there will be a contrast because the materials are of a different composition, on different layers, and of different colors).

6. Claim 10 is rejected under 35 U.S.C. 102(e) as being anticipated by Terry et al. (US 6,296,066 B1).

Regarding claim 10, Terry discloses a tubing (figure 1, numeral 20) comprising:

an outer wear layer ("wear layer 36" at column 10, line 22); and

a contrasting layer beneath the wear layer ("underlying load carrying layers 34" at column 10, line 27);

wherein if the outer wear layer is worn away, the contrasting layer becomes visible as a contrasting feature on the tubing (the wear layer "can be of a different fiber and color making it easy to determine the wear locations" at column 10, line 33).

7. Claims 1, 2, 31, 36 and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Newman (US 6,31,596 B1).

Regarding claim 1, Newman discloses:

an imaging device ("optical scanning device(s), or with camera(s)" at column 3, line 45) recording video signals of a segment of coiled tubing as the tube is employed into a well (as depicted in figure 3; "while it is being unspoiled and run into a bore hole" at column 3, line 23);

a conductor transmitting the signals to a processor (as depicted in figure 3, each of the sensors are connected to processor 210);

an image grabber generating an image of the tubing (figure 3, numeral 207; this is a data acquisition device and given that one of the sensors is a camera, the data acquisition device necessarily grabs frames, or images from the camera); and

a program in the processor (i.e., figure 3, numeral 210) analyzing the image to detect predetermined features of the tubing segment (images of a "visible line", or

"lines", or "dots" marked along the tubing length are captured and analyzed for "location" and "amount of rotation" of the tubing; i.e., "take discrete rotational measurement at one or a plurality of locations on a length of coiled tubing" at column 3, line 21).

Regarding claim 2, the coordinates of the tubing segment are generated ("locations" at column 3, line 45).

Regarding claim 31 and 36, the limitations therein are met by Newman as described in the claim 1 rejection above. Newman processes images from cameras of the stripes to determine rotation of the tube, among other things, "along the length of the coiled tubing" (column 4, line 26).

Regarding claim 38, Newman anticipates camera locations along a levelwind ("located anywhere ..." at column 6, line 47).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Terry et al. (US 6,296,066 B1) and Newman (US 6,31,596 B1).

Claims 11 and 12:

Regarding claim 11, Terry does not teach one or more stripes on the outer layer parallel with the longitudinal axis of the tubing.

Regarding claim 12, Terry does not teach the stripes being individually distinguishable.

Newman discloses a system in the same field of well digging, and same problem solving area of monitoring faults in tubing, where Newman teaches tubing with plural stripes ("tubing can be marked" and "series of visible lines is marked along the coiled tubing" which are marked "along its length" at column 3, lines 40-44) individually distinguishable from one another (the lines are "visible", and separate, and thus individually distinguishable).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to mark the tubing of Terry, with the lines taught by Newman, in order to provide an indication for the measurement of "amount of rotation" (Newman, column 3,

line 46) for "accurately determining coiled tubing fatigue life and/or deformation" (Newman, column 4, line 61) to ensure proper functioning of the tube, and avoid the cost associated with a tube's failure during an operation.

Claims 13 and 14:

Regarding claim 13, Newman discloses an image device, processor and program as described in the rejections above. Newman discloses the deployment and measurement of rotation of coiled tubing having longitudinal stripes (refer to the rejections above).

Regarding claim 14, Newman's stripes are "visible" to the cameras, and are thus a predetermined color. Newman analyzes the images of the stripes to determine tube rotation, and thus detects the stripes as called for by the claim.

Newman does not teach a composite coiled tubing having layers of fibers form the tubing wall.

Terry teaches a coiled tubing for deployment into a well, the tubing comprising a composite coiled tubing (figures 2 and 3) having layers of fibers form the tubing wall ("fiber" at column 10, line 32).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the tubing taught by Terry, as the tubing required by Newman, because it is "very strong" and "resistant to abrasion" (Terry, column 10, line 28), thus preventing premature wear and failure due to continuous deployment into and out of wells.

10. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Puffer (US 4,563,095 A).

McCoy discloses a system for surface inspection of a coiled tube as it is being deployed (figure 4; "dents, wall thinning, cracks" are measured at column 5, line 33).

While McCoy is open to "any suitable type [of measurement apparatus] know in the art for taking the desired measurements" (column 5, line 36), McCoy does not teach an image processing measurement apparatus commensurate with the requirements of claim 26.

Puffer discloses a system for inspecting an elongated tubular body in motion (figure 1, numeral 18), comprising:

a processor (figure 2, numeral 44);

an output device (figure 2, numeral 58);

image input device receiving sequential images of the object (figure 1, numeral 38);

pattern classifier extracting features and comparing the size against user-defined thresholds (Puffer discloses at least two thresholds that meet this requirement: First, the "intensity of the light signal for a respective pixel exceeds a threshold which is preselected" at column 5, line 65 and second, "preselected count ... indicative of a flaw" at column 6, line 3); and

where if the size does not fall within the threshold, an interrupt indicating that a defect as been located is generated ("output 55 to an annunciator or alarm 56 ... indicative of a flaw" at column 6, line 5).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the inspection technique of Puffer, in order to determine and detect flaws in the tubing of McCoy, in order to provide:

a "noncontact monitoring process which does not inhibit the speed" of the object (Puffer, column 1, line 41), thereby ensuring that further wear and tear of the tube is not caused by the measurement device and allowing tube deployment at regular speeds,

that can "detect different types of such irregularities .... anywhere about its periphery and along its length, and take appropriate corrective or preventative measures" (Puffer, column 1, line 35), thereby ensuring that defects can be found anywhere on the tube,

and which can prevent the indication of false defects ("falsely" at column 6, line 35) thus ensuring an accurate determination of defects.

Note: While the processor of Puffer (i.e., figure 2, numeral 44) is not explicitly disclosed as being computerized, given that the patent issued in 1986, it probably was. However, even if the process was not computerized (i.e., running on a processor under software control), it would have been obvious at the time the invention was made to one of ordinary skill in the art to program, in the McCoy and Puffer combination, the computer of McCoy (i.e., McCoy figure 4, numeral 54) to perform the analytical functions of Puffer.

11. Claims 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Puffer (US 4,563,095 A) as applied to claim 26 above, and further in combination with Kanzaka et al. (US 5,680,473 A).

The McCoy and Puffer combination does not receive location data indicating the position of a defect, generating the warning, and transmitting the image containing the defect and the location to the output device.

Kanzaka discloses a system for inspecting an elongated body in motion (figure 1, numeral 1; "surface inspection" at column 1,line 12), comprising receive location data indicating the position of a defect ("location thereof" at column 3, line 6), and transmitting the image containing the defect and the location to an output device ("based on a defect detection signal d ... the video signal v and the data D from the video processor unit 5 are mixed to provide a composing signal C which is delivered to a video signal recorder unit 8" at column 3, line 35).

Regarding claims 28 and 29, the output device of Kazaka includes a monitor (figure 1, numeral 12) and a printer (figure 1, numeral 12).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to record the defect location and image each time the defect alarm is generated in the McCoy and Puffer combination as taught by Kanzaka, in order to provide a permanent record of both the defect location and the defect image so that an operator can view and further classify the defects to ensure "an accurate judgment to

the acceptance or rejection of the defect on the inspected object" as described by Kanzaka, at column 4, lines 26-38.

Regarding claim 30, the McCoy and Puffer combination does tech the classifier as recognizing unwanted defects and ignoring innocuous defects.

Kanzaka discloses his classifier as recognizing unwanted defects ("X marks ... cannot be overlooked" at column 3, line 18) and ignoring innocuous defects ("O marks ... may be ignored" at column 3, line 20).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to train the classifier of the McCoy and Puffer combination to distinguish between unwanted and innocuous defects as taught by Kanzaka, to further improve accuracy by flagging innocuous defects as such, and directing the operator's attention to more serious defects that could cause failure, and reduce the dowtime association with an operator having to review surface conditions that are not serious, and will not cause failure.

12. Claim 1, 5-7, 9, 15, 17, 22, 23, 31-33, 37, 39 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Gorria et al. (US 5,408,104 A).

Regarding each of the claims, McCoy discloses a system for surface inspection of a coiled tube as it is being deployed (figure 4; "dents, wall thinning, cracks" are measured at column 5, line 33).

Regarding claims 9 and 32 specifically, a warning event is initiated (figures 3, numeral 56 and figure 5, "failure").

Regarding claim 33, a guide is disclosed (figures 1-3).

While McCoy is open to "any suitable type [of measurement apparatus] known in the art for taking the desired measurements" (column 5, line 36), McCoy does not teach an image processing measurement apparatus commensurate with the requirements of the claims.

Regarding each of the claims, Gorria discloses a system for inspecting an elongated tubular body in motion ("tubular product ... movable vertically" at column 7, lines 28 and 32), comprising plural imaging devices (figure 3), capturing images of the tubular circumferences and passing the images to a processor where the images are processed by software (figure 1, numerals 18 and 19), and identifying predetermined features on the tubing ("scratches, cracks" at column 12, line 29 as well as other defects such as those listed at column 1, lines 60-64).

Regarding claim 17, three CCD cameras are disclosed (figure 2, numeral 9).

Regarding claim 23, a recorded is disclosed ("recording" at column 6, line 23).

Regarding claim 37 specifically, power is provided to the cameras and an illumination device (figures 1-3).

Regarding claims 5 and 39, the images are stored before processing ("acquisition card or board" at column 8, line 19; figure 5).

Regarding claim 41, size thresholds are disclosed ("threshold" at column 11, line 63; "too small" at column 2, line 9).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the image inspection taught by Gorria, to inspect the moving coil tubing as required by McCoy, in order to inspect for and detect the dents, thinning and cracks as called for by McCoy to "provide for quantitative measurement of the magnitude thereof and to suppress or considerably attenuate the influence of the general appearance of the surface to be monitored" (Gorria, column 1, line 35), thereby not taking into account "certain defects of dimensions which are to small to have an influence on the characteristics of use of the products" (Gorria, column 2, line 9). The effect of the Gorria system is to reduce the indication of false defects and thus providing an accurate surface inspection system.

13. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Newman (US 6,31,596 B1) and Kanzaka et al. (US 5,680,473 A).

While Newman discloses determining "locations from which the amount of rotation can be calculated ... electronically" (column 3, line 46), Newman does not disclose stamping the coordinates of the tube onto the image of the tube segment.

Kanzaka discloses a system for inspecting an elongated body in motion (figure 1, numeral 1; "surface inspection" at column 1,line 12), comprising receiving location data indicating a position of a defect ("location thereof" at column 3, line 6), and stamping the coordinates of the tube onto the image of the tube segment ("composing section 6, the video signal v and the data D ... are mixed to provide a composing signal C which is delivered to a video signal recorder" at column 3, line 37).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to mix the location coordinates and images of Newman as taught by Kanzaka in order to have a log of the actual images along with locations for future review and analysis of tube rotations, and to be able to pinpoint exactly where on the tubing defects are located for longevity analysis are repair/correction of the tubing.

14. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Gorria et al. (US 5,408,104 A) as applied to claim 1 above, and further in combination with Endsley et al. (US 6,05,613 A).

While the McCoy and Gorria combination anticipates the use of a color matrix CCD cameras (Gorria, "matrix-type CCD camera" at column 12, line 54), the combination does not teach 640X480 resolution with 8 bits per color.

Endsley discloses an CCD camera comprising 640X480 resolution with 8 bits per color ("Kodak KAI-0320CM", "640 columns and 480 rows", "8-bit" at column 3, lines 26, 28 and 36).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the CCD camera taught by Endsley, as the CCD camera required by the McCoy and Gorria combination, in order to keep the system cost low by using a standard, commercially available and off-the-shelf camera, while providing a high quality 640X480 image to ensure an accurate inspection.

15. Claims 8, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Gorria et al. (US 5,408,104 A) as applied to claim 6 above, and further in combination with Newman (US 6,31,596 B1).

Claims 8 and 25:

The McCoy and Gorria combination does not suggest "diameter" as one of the predetermined features for measurement.

Newman, in a system for determining defects and fatigue in a deploying coiled tubing, suggests the determination of "diameter" ("diameter" at column 4, line 21 and column 1, line 58).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include a determination of diameter as suggested by Newman, as part of the coiled tube evaluation of the McCoy and Gorria combination, because "change in diameter" is an indicator of "deformations that can cause problems when using the coiled tubing" (Newman, column 1, line 60-62). This inclusion of a "diameter" measurement in the McCoy and Gorria combination further serves to ensure an accurate determination of the tubing's condition.

Claim 24:

The McCoy and Gorria combination does not teach one or more stripes on the outer layer parallel with the longitudinal axis of the tubing.

Newman discloses a system in the same field of well digging, and same problem solving area of monitoring faults in tubing, where Newman teaches tubing with plural stripes ("tubing can be marked" and "series of visible lines is marked along the coiled tubing" which are marked "along its length" at column 3, lines 40-44) individually distinguishable from one another (the lines are "visible", and separate, and thus individually distinguishable).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to mark the tubing of the McCoy and Gorria combination, with the lines taught by Newman, in order to provide an indication for the measurement of "amount of rotation" (Newman, column 3, line 46) for "accurately determining coiled tubing fatigue life and/or deformation" (Newman, column 4, line 61) to ensure proper functioning of the tube, and avoid the cost associated with a tube's failure during a mining operation.

16. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Gorria et al. (US 5,408,104 A) as applied to claim 15 above, and further in combination with Greenwood et al. (US 3,770,111 A).

While the McCoy and Gorria combination requires image capture devices around the periphery of the tubing, McCoy and Gorria do not teach the use of fiber optic image devices.

Greenwood discloses an optical inspection system wherein Greenwood teaches the use of fiber optic imaging devices ("fiber light guides" at column 3, line 58).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the fiber optic image devices of Greenwood, in order to capture the images required by the McCoy and Gorria combination, in order to "gather light over a much larger portion" of the tubing (Greenwood, column 4, line 1) with "a considerable decrease in optical complexity" (Greenwood, column 4, line 4), thereby providing an accurate and detailed image using a less complex, less prone to failure and lower cost image system.

17. Claims 18, 21, 34, 35 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Gorria et al. (US 5,408,104 A) as applied to claims 15 and 31 above, and further in combination with Kanzaka et al. (US 5,680,473 A).

Regarding each of the claims, the McCoy and Gorria combination inspect and record defects along a length of tubing while in motion. Regarding claim 21 specifically, the McCoy and Gorria combination have a stacker (figure 5; "acquisition card or board" at column 8, line 19).

Regarding each of the claims, McCoy and Gorria do not teach a counter identifying a location along the tubing, where the computer reads the counter to identify the location at which a defect is found.

Regarding claims 34, 35 and 40 specifically, McCoy and Gorria do not teach displaying the images of the features, indicating the position of a defect in the tubing.

Kanzaka discloses a system for inspecting an elongated body in motion (figure 1, numeral 1; "surface inspection" at column 1,line 12), comprising receiving location data indicating a position of a defect ("location thereof" at column 3, line 6). Specifically, Kanzaka teaches a counter identifying a location along the tubing (figure 1, numeral 1'; "rotary encoder" at column 3, line 60), where the computer reads the counter ("to the video processor" at column 3, line 63) to identify the location at which a defect is found ("distance data will be contained in the data D" at column 3, line 6; "defect position" at column 4, line 10). Kanzaka stamps the coordinates of the tube onto the image of the tube segment ("composing section 6, the video signal v and the data D ... are mixed to provide a composing signal C which is delivered to a video signal recorder" at column 3, line 37).

It would have been obvious at the time the invention was made to one of ordinary skill in the art provide and encoder and distance information taught by Kanzaka, to the computer of the McCoy and Gorria combination, in order to precisely note the location of the defect so that it can be further examined by an operator and/or repaired, and to provide data for the ultimate determination of the tube's life and possible failure modes.

18. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Gorria et al. (US 5,408,104 A) as applied to claim 15 above, and further in combination with Chiu et al. (US 6,031,931 A).

The McCoy and Gorria combination inspect and record defects along a length of tubing while in motion. Regarding claim 21 specifically, the McCoy and Gorria combination have a stacker (figure 5; "acquisition card or board" at column 8, line 19).

Regarding each of the claims, McCoy and Gorria does not teach a counter identifying a location along the tubing, where the computer reads the counter to identify the location at which a defect is found.

Regarding claims 19 and 20 specifically, McCoy and Gorria do not teach disabling or enabling the inspection system based on sensor speed.

Chiu discloses a system for inspecting an elongated body in motion (figure 3), comprising a counter ("cycle detector" and "encoder" at column 6, line 5) receiving location data indicating a position of a defect ("position" at column 6, line 28) and disabling or enabling the inspection system based on sensor speed ("beginning of a cycle" at column 6, line 6; "synchronize camera operation with movement" at column 6, line 37).

It would have been obvious at the time the invention was made to one of ordinary skill in the art provide the encoder and distance information taught by Chiu, to the computer of the McCoy and Gorria combination, in order to detect the "beginning" of inspection (Chiu, column 6, line 6) when the tube starts to move, to "synchronize camera operation with" the tube's movement (Chiu, column 6, line 37), and to precisely

note the location of the defect so that it can be further examined by an operator and/or repaired, and to provide data for the ultimate determination of the tube's life and possible failure modes.

19. Claims 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McCoy et al. (US 5,767,671 A) and Gorria et al. (US 5,408,104 A) as applied to claim 31 above, and further in combination with Husseiny (US 5,210,704 A).

The McCoy and Gorria combination does not teach identifying a feature as a defect by determining if a defect size has grown beyond a percentage of its original size.

Husseiny discloses a system in the field of defect inspection and failure analysis, comprising identifying a feature as a defect by determining if a defect size has grown beyond a percentage of its original size (figure 17).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to monitor defect growth on the coiled tubing of the McCoy and Gorria combination, and thereby identifying defects when a threshold has been reached as taught by Husseiny, in order to identify "incipient failures ... during operation" and provide an indication to the operation of the tube's "expected life" along with "a warning for the remaining time until failure of the equipment" (Husseiny, column 4, lines 40-54), thereby providing the operator with the ability to predict a failure before it actually occurs in order to take appropriate action and avoid costly losses during an operation.

20. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination Newman (US 6,31,596 B1) and Husseiny (US 5,210,704 A).

Newman does not teach identifying a feature as a defect by determining if a defect size has grown beyond a percentage of its original size.

Husseiny discloses a system in the field of defect inspection and failure analysis, comprising identifying a feature as a defect by determining if a defect size has grown beyond a percentage of its original size (figure 17).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to monitor defect growth on the coiled tubing of Newman, and thereby identifying defects when a threshold has been reached as taught by Husseiny, in order to identify "incipient failures ... during operation" and provide an indication to the operation of the tube's "expected life" along with "a warning for the remaining time until failure of the equipment" (Husseiny, column 4, lines 40-54), thereby providing the operator with the ability to predict a failure before it actually occurs in order to take appropriate action and avoid costly losses during an operation.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Werner whose telephone number is 703-306-3037. The examiner can normally be reached on M-F, 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on 703-305-4706. The fax phone

numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

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Patent Examiner
February 4, 2003

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